

Claims

1. SMC (Sheet Moulding Compound) for producing fibre-reinforced thermosetting components consisting of a resin matrix (2) which is fibre-reinforced with unidirectional fibres (UD fibres) (7) arranged in axial alignment and advantageously with additional cut fibres (random fibres) (4) arranged in non-aligned manner in the resin matrix (2), characterised in that several layers of SMC containing UD fibres (7) with a different axial alignment from one another are arranged in the component.
2. SMC according to Claim 1, characterised in that the random fibres (4) are glass fibres and the UD fibres (7) are carbon fibres or vice versa.
3. SMC according to Claim 1, characterised in that the UD fibres (7) and the random fibres (4) are carbon fibres.
4. SMC according to Claim 1, characterised in that the UD fibres (7) are carbon fibres and no random fibres (4) are used.
5. SMC according to Claim 1, characterised in that the UD fibres (7) are "heavy tow" carbon fibre tows or "heavy tow" broad-strip carbon fibre tows.
- SMC according to one of Claims 1 to 5, characterised in that the UD fibres (7) are shortened by incisions in the finished SMC to produce flowability in the fibre direction.

7. SMC according to Claim 6, characterised in that the cutting width of the tool for cutting the UD fibre layers is between 2 mm and 15 mm.

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A₂ 5. 8. SMC according to one of the preceding claims, characterised in that a different resin matrix (2) is used for the random fibres (4) and the UD fibres (7).
- 10 9. SMC according to one of the preceding claims, characterised in that, to check the UD fibre directions, individual UD glass fibres are introduced into the matrix (2) in the direction of the UD carbon fibres (7) as contrast fibres.
- 15 10. SMC according to one of the preceding claims, characterised in that the SMC weight per unit area is less than 1000 gram/m².
- 20 11. SMC according to one of the preceding claims, characterised in that the resin matrix (2) contains electrically conductive additives.
- 25 12. Process for producing a fibre-reinforced SMC according to one of Claims 1 to 11, characterised
- in that SMC mats with a single layer of UD fibres (7) are produced and
- 30 - in that a plurality of SMC mats is arranged, prior to further processing to form the component (16), with multi-axial alignment of the UD fibres (7) by building up into a stack (19).
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13. Process according to Claim 12, characterised in that all the UD fibre layers (7) used are aligned in the 0° direction and any desired number of fibre layers (7) are used.

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14. Process according to Claim 12 or 13, characterised in that at least four UD fibre layers (7) are arranged.

- 10 15. Process according to Claim 14, characterised in that the four UD fibre layers (7) have the following alignment

$0^\circ, 90^\circ, 90^\circ, 0^\circ$ or $0^\circ, 90^\circ, 0^\circ, 90^\circ$.

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16. Process according to Claim 12 or 13, characterised in that at least six UD fibre layers (7) are arranged.

- 20 17. Process according to Claim 16, characterised in that the six UD fibre layers (7) have the following alignment

$0^\circ, 90^\circ; +45^\circ, -45^\circ, 90^\circ, 0^\circ$.

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18. Process according to Claim 12 or 13, characterised in that eight UD fibre layers (7) are arranged.

- 30 19. Process according to Claim 18, characterised in that the eight UD fibre layers (7) have the following alignment

$0^\circ, 90^\circ; +45^\circ, -45^\circ, +45^\circ, -45^\circ, 90^\circ, 0^\circ$.

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Process according to one of Claims 12 to 19,
characterised

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- in that the SMC mats are cut into strips (12) and
wound onto spools or reels (8),

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- in that the strips (12) are cut to length and
arranged in rectangular blank layers (11) and

- in that the individual blank layers (11) are
built up into a stack (19) on a rotary table (14).

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21. Process according to Claim 20, characterised in
that the stack (19) is placed into the mould
(press) (18) for producing the component (16) or
else is preshaped by prepressing for the purpose of
securing.

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22. Process according to Claim 21, characterised in
that the press for preshaping is an inverse form of
the mould for producing the component (16).

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23. Process according to one of the preceding claims,
characterised in that the strips (12) are wound
onto spools with a core diameter of greater than
200 mm and an outside diameter of greater than
500 mm.

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24. Process according to one of the preceding claims,
characterised in that the SMC is flowable and the
blank size is always smaller than the laid out
component surface.

25. Component made of fibre-reinforced thermosets, characterised in that this component is produced from an SMC according to one of Claims 1 to 24.
- 5 26. Component according to Claim 25 for use as an exterior part of a motor vehicle.